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Applicant : Baggett et al. Art Unit : 2166
Serial No. : 09/431,366 Examiner : Khanh Pham
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Title : METHOD AND APPARATUS FOR PROVIDING AVAILABILITY OF
AIRLINE SEATS

Mail Stop Appeal Brief - Patents

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APPEAL BRIEF ON BEHALF OF DAVID BAGGETT ET AL.

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(i.) Real Party In Interest

The real party in interest in the above application is ITA Software, Inc.

(ii.) Related Appeals and Interferences

The appellant is not aware of any appeals or interferences related to the above-identified patent application.

(iii.) Status of Claims

The claims have been twice rejected. Claims 1-32, all of the claims in the application are the subject of this appeal.

(iv.) Status of Amendments

All amendments have been entered. Appellant filed a Notice of Appeal on March 24, 2006.

(v.) Summary of Claimed Subject Matter

Background

This invention relates generally to determining airline seat availability information for use in travel planning and travel reservation systems. [Specification page 1, lines 4-6]

Airlines institute selling policies that can change to meet supply and demand considerations to maximize profit on any given flight. When a passenger specifies an itinerary, the itinerary has one or more flight segments. In order to issue a ticket for a single or multi-flight segment itinerary, each flight segment must be available. That is, each flight segment must have seats that have not been already reserved for other passengers. Availability can also be governed by whether an airline will sell to a particular passenger given characteristics of the passenger. Common characteristics which are used by airlines to decide whether or not to sell a ticket is the price that the passenger is willing to pay for the ticket, whether the passenger is using other flights on that airline, whether the passenger is a frequent flyer and so forth. [Specification page 1, lines 7-20]

Generally, before booking a flight and issuing a ticket, the seller can send a request for availability information to the airline. [Specification page 1, lines 21-23]

Appellant's Invention

Claim 1

One aspect of Appellant's invention is set out in claim 1 as a method executed on a computer system for managing a cache including entries that correspond to seat availability information. "Referring now to FIG. 2, the server process 18 is preferably executed on the server computer 12 but could be executed on the client 32." [Specification page 6, lines 26-29].

The inventive features of claim 1 include proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information. "The cache manager 150 provides additional processing in order to keep the highest quality information in the cache 152 so that the query responses are as useful as possible. The cache manager 150 can operate when availability queries to the cache 152 are not being made or are not pending, or can operate continually ("in the background" or "as a daemon") independent of the availability queries posed to the cache 152. The cache manager 150 implements a management strategy that is dependant on the availability queries being posed to the cache 152.

A travel planning system needs to make availability queries to gather data to complete the travel planning processing. Since availability data is expected to change slowly relative to query rates, and since live availability queries to the airlines can be costly in both time and money, a cache is inserted between the travel planning system and the source of availability data. Furthermore, a cache manager 150 is inserted between the availability cache 152 and the source 20c of availability data, to proactively populate the cache 152 to maintain a high quality level of data in the cache 152 for quick and easy access by the travel planning system 10." [Specification page 12, line 23 to page 13, line 10].

The inventive features of claim 1 address the situation if the stored answer pertaining to seat availability information is stale. "In addition, the answer can include a confidence factor based on whether the query is stale or whether an actual query was performed." [Specification page 11, line 32 to page 12 line 2] sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale. "The cache manager 150 determines what entries are to be kept in the cache, and submits appropriate "Requests" to the availability source 20c at the appropriate time to obtain the "Responses" that are stored in the cache 152. ... Further, the cache manager 150 might decide that a query should be submitted to the source to gather fresh data about the entry "DL1823 04NOV BOS-LGA 7:30" and either update that entry in the cache or add it if not already present." [Specification page 14, lines 8-19].

Claim 5

Another aspect of the invention is covered by claim 5. Claim 5 is directed to an availability system used for a travel planning system. [Specification page 4, lines 5-9].

Inventive features of Claim 5 include a cache including a plurality of entries of availability information of seats for a mode of transportation. "The availability predictor 65 can be based upon a cache or database of stored availability queries," [Specification page 5, lines 25-26].

Inventive features of Claim 5 also include a cache manager "Referring to FIG. 7, a database manager here implemented as a cache manager 150 to manage a cache 152 is shown." [Specification page 12, lines 3-5] that manages a quality level of entry information in the cache by proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale.

Claim 19

Another aspect of the invention is covered by claim 19. Claim 19 is directed to a computer program product residing on a computer readable medium for managing a cache for predicting availability information for a mode of transportation.” This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 19 include proactively determining whether a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on the mode of transportation, with instructions to determine being based on a determined criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 19 include updating the stored answer in the cache when the stored answer is stale by sending an availability query to a source of availability information for the mode of transportation. This feature is supported by the analogous feature of claim 1.

Claim 23

Another aspect of the invention is covered by claim 23. Claim 23 is directed to a computer program product for determining seat availability in a travel planning system. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 include instructions to cache entries of seat availability information for a mode of transportation. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 also include instructions to manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified; This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 also include instructions to delete or modify the entry based on determining that the entry should be deleted or modified. “Referring to FIG. 11A, another manage process 150d for determining what entries are important to add, delete, or update

is based on demand. The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information.” [Specification page 18, line 31 to page 19, line 5]

Inventive features of Claim 23 also include instructions to proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining whether the entry should be added or modified. “When the cache manager 150 is going to freshen an entry by making a query to the availability source 20c, it selects the entry to freshen as follows:” [Specification page 23, lines 11-14]

Claim 30

Another aspect of the invention is covered by claim 30. Claim 30 is directed to a method for managing availability information for a seat on a mode of transportation. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 30 include determining which entries to add, delete, or update in the cache by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information. This feature is supported by the analogous feature of claim 23.

Inventive features of Claim 30 also include proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand. “Referring to FIG. 11A, another manage process 150d for determining what entries are important to add, delete, or update is based on demand. The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information. If a flight is determined to have a higher than average or higher than expected demand, then it might be added to the cache earlier than it would have been otherwise, or it might be updated more often to make sure the information is fresh.”

[Specification page 18, line 31 to page 19, line 13].

(vi.) Grounds of Rejection to be Reviewed on Appeal

(1) Claims 1-3, 5-21, 23-32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic (US 6,122,642 A) (hereinafter Mehovic) and in view of Filepp et al. (US 2003101 67307 A1) (hereinafter Filepp).

(2) Claims 4 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic and Filepp, and Khosravi-Sichani (US 5,983,217 A), hereinafter "Khosravi".

(vii.) Argument

Obviousness

"It is well established that the burden is on the PTO to establish a prima facie showing of obviousness, *In re Fritsch*, 972 F.2d. 1260, 23 U.S.P.Q.2d 1780 (C.C.P.A., 1972)."

"It is well established that there must be some logical reason apparent from the evidence or record to justify combination or modification of references. *In re Regal*, 526 F.2d 1399 188, U.S.P.Q.2d 136 (C.C.P.A. 1975). In addition, even if all of the elements of claims are disclosed in various prior art references, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art why one of ordinary skill in the art would have been prompted to combine the teachings of the references to arrive at the claimed invention. *Id.* Even if the cited references show the various elements suggested by the Examiner in order to support a conclusion that it would have been obvious to combine the cited references, the references must either expressly or impliedly suggest the claimed combination or the Examiner must present a convincing line of reasoning as to why one skilled in the art would have found the claimed invention obvious in light of the teachings of the references. *Ex Parte Clapp*, 227 U.S.P.Q.2d 972, 973 (Board. Pat. App. & Inf. 985)."

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, "[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the

prior art suggested the desirability of the modification." *In re Laskowski*, 10 U.S.P.Q. 2d 1397, 1398 (Fed. Cir. 1989).

"The claimed invention must be considered as a whole, and the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (emphasis in original, footnotes omitted).

"The critical inquiry is whether 'there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" *Fromson v. Advance Offset Plate, Inc.*, 225 U.S.P.Q. 26, 31 (Fed. Cir. 1985).

**(1) Claims 1-3, 5-21, 23-32 are patentable over
Mehovic and Filepp.**

Claims 1 and 19

For the purpose of this appeal only, claims 1 and 19 stand or fall together. Claim 1 is representative of this group of claims.

Claim 1 is directed to a method executed on a computer system for managing a cache including entries that correspond to seat availability information. Claim 1 includes the feature of proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information... .

The examiner takes the position that Mehovic substantially teaches the claimed invention including an airline computerized reservation system ("CRS") to provide flight and seat availability information (Col. 2 lines 5-20), cache (Fig. 4, element 20) that stores data propagated from the CRS 12 in response to queries from a client 26 (Col. 3 lines 54-58). The examiner also contends that Mehovic teaches a different cache management algorithm. According to the examiner: "Mehovic synchronizes the cache 20 with the CRS by propagating data immediately after CRS 12 updates the data or at definable intervals of time (Col. 3 lines 59-65), and therefore does not teach proactively update the cache based on frequency of access to the cache as claimed."

The examiner relies on Filepp to teach this feature. According to the examiner:

... However, Filepp teaches an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Filepp's cache management algorithm with Mehovic's CRS system so that "only the latest version of the object will be provided to guarantee currency of information to the user" as noted by Filepp at page 50, [0821]. By factoring the frequency of updating of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the flights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.

Appellant contends that the examiner misconstrues Appellant's claim 1. Claim 1 is directed to a methodology of updating a cache that holds answers to seat availability queries. Conventionally, a travel planning system makes seat availability queries directly to an airline's revenue management system. However, this approach poses problems for travel planning systems, especially those that conduct low fare searches that return many possible answers, because this approach to determine seat availability for an itinerary incurs a monetary cost and a cost in delay in returning answers.

Appellant contends that Mehovic fails to disclose that the CRS includes a revenue management system or the like, and never disclosed to migrate seat availability information to the RDBMS. Appellant also contends that it is not logical to assume that Mehovic migrates the seat availability information, since Mehovic is directed to a fundamentally different problem

than that of Appellant. Mehovic teaches: "to automate the migration of data structures from an airline TPF based CRS processing environment and, in particular, the American Airlines' SABRE TPF based CRS environment to a relational database management system (RDBMS) for transparent retrieval and use by the end user."

In the examiner's Response to Arguments, the examiner states that: "Applicant argued that 'Mehovic does not teach any of the features of claim 1'." Particularly, Mehovic does not teach "provid[ing] flight and seat availability information"."

Appellant does not disagree with the general proposition that seat availability data predates Appellant's invention. However, nowhere was the examiner able to show that "seat availability information" was migrated in Mehovic to the RDBMS. Appellant, however, has shown that migration of that data is not disclosed in Mehovic nor would migration of the seat availability data serve any purpose in Mehovic.

Mehovic is directed to a migration tool for what is essentially reservation information, e.g., PNR's (passenger name records) "the industry standard database representation for a passenger's trip that includes flight, booking-code, fare and payment information, as well as passenger names and contact information. However, PNR's are the result of using a travel planning system, searching for flights and fares that satisfy a travel query and determining that seats on flights in a solution to the travel query are or will be made available to the querier. The PNR is not used in the flight/fare search process but rather is used after that process has run to store reservation information after a solution is booked, e.g., a ticket issued. Because Mehovic is directed to migration of transaction data from CRS systems to the RDBMS, it would not make any sense to migrate seat availability information, because that seat availability information was already evaluated prior to forming the transaction data that is migrated. Migrating seat availability information would serve no purpose when migrating transaction data, e.g., PNR's, as taught by Mehovic.

Appellant contends that the feature the examiner relies on, namely, a cache including entries that correspond to seat availability information, is not disclosed or suggested by Mehovic. Indeed, Mehovic does not even mention seat availability information. Rather, Appellant contends that the examiner improperly relies on an inherency argument that "a cache including entries that

correspond to seat availability information" is inherent¹ in Mehovic. Appellant contends that any argument that relies on inherency in the context of an obviousness rejection is improper. "The concept of inherency is not applicable to the question of obviousness." *In re Sporman*, 363 F.2d 444, 150 USPQ 449 (CCPA 1965). To refer to an unexpected property or parameter as inherent begs the question of whether the unexpected property rebuts *prima facie* obviousness.

Accordingly, there is no basis upon which to infer that Mehovic inherently migrates seat availability data. Therefore, the examiner has not shown that Mehovic teaches: "a cache including entries that correspond to seat availability information," as recited in claim 1.

The examiner recognized at least one of the deficiencies in Mehovic's teachings as applied to Appellant's claims. The examiner notes that Mehovic uses a different cache management algorithm. However, the examiner improperly characterizes this feature of Appellant's claim 1, when the examiner states that Filepp teaches: "proactively update the cache based on frequency of access to the cache as claimed." Claim 1 does not recite this. Rather, claim 1 recites: "proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information ... with determining ... based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache"

The Combination of Mehovic with Filepp Is Not Suggested

Assuming *arguendo* that Filepp teaches the cache management scheme, recited in claim 1, Applicant contends that there is no motivation to modify Mehovic to apply Filepp's cache management scheme. The examiner urges that the motivation is: "so that 'only the latest version of the object will be provided to guarantee currency of information to the user,' as noted by Filepp at page 50, [0821].

¹ Mehovic teaches a method for migrating data from the SABRE computerized reservation system to a relational database management system (i.e., a cache) for retrieval and used by the end user. The SABRE system is well known in the art and has been used by travel agents since 1960s to retrieve flight information, seat availability and booking information. All basic features of the SABRE system should be inherent to a skill in the art and need not be explicitly recited. Therefore, it is unreasonable to state that the SABRE system does not provide flight and seat availability information, as argued by applicants. Mehovic teaches the detail of information stored in the relational database, which includes: Reservation, Segment, Passenger and ticket at Col. 6 lines 40-67 et seq. [Examiner's Action of Nov. 29, 2005, Response to Arguments Pages 6-7]

Appellant contends that this motivation is illogical when viewed with Mehovic's system. Indeed, if the desired outcome was to ensure that only the latest version of information in the TPF system of Mehovic was migrated to the RDBMS system of Mehovic, what better way to satisfy that desire than by migrating the data when the data in the TPF system changes, as Mehovic already taught, since it is the TPF system and not the RDBMS system that knows when updates are available.

The examiner argues that: "By factoring the frequency of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the flights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current . . ." However, this motivation is illogical when applied to Mehovic, because Mehovic is dealing with a migration tool, where the frequency of changes in the TPF system are not based on current needs of the RDBMS system or the clients attached to the system, but instead at the rate that the TPF system changes data.

It would be illogical to update on the basis of either Mehovic client's needs or Mehovic's RDBMS, since the TPF migrates to the RDBMS all of the data structures that are in the TPF system and it is the TPF that knows when data has changed. Thus, the logical way to update the RDBMS is the way that Mehovic describes: "as changes occur in the TPF" or "on a defined basis... using a log in the TPF to save changes," (of course at the cost that the RDBMS would occasionally have incomplete data). There is no need in Mehovic for any cache management technique that updates proactively, as in claim 1, because the TPF already updates the RDBMS and the update could not be accomplished any faster than disclosed by Mehovic were Mehovic to be modified by Filepp to provide for a proactive update.

It is well established that: "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). In the instant case, the proposed modification of Mehovic with Filepp provides an update scheme that changes the manner in which Mehovic would migrate data. Indeed, the modification is less desirable than that disclosed in the primary reference. Therefore, Mehovic combined with Filepp is a proposed combination

that destroys the intent, purpose and principal of operation of Mehovic, the primary reference, and thus is not suggested.

Filepp Does Not Teach the Update Mechanism that the Examiner Relies on

Notwithstanding the lack of motivation to combine Mehovic with Filepp, neither the examiner's motivation nor the proposed combination is directed to the claimed feature of "proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information ... with determining ... based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache"

The examiner characterizes Appellant's cache update mechanism as "proactively update the cache based on frequency of access to the cache as claimed." This is incorrect. Rather, the cache is updated based on needs of the system that makes the queries to the cache for the information in the cache, e.g., the travel planning system. Thus, as those needs change, the cache is proactively updated with availability data deemed necessary for the travel planning system.

However, Filepp does not teach the cache update mechanism that the examiner relies on. Filepp fails to teach "wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]).", as the examiner urges. Rather, Filepp discloses in paragraphs [0821]-[0823]:

[0821] When objects are requested from object storage facility 439, only the latest version of the object will be provided to guarantee currency of information to the user. Object storage facility 439 assures currency by requesting version verification from network 10 for those objects which are available locally and by requesting objects which are not locally available from delivery system 20 where currency is maintained.

[0822] Version verification increases response time. Therefore, not all objects locally available are version checked each time they are requested. Typically, objects are checked only the first time they are requested during a user session. However, there are occasions, as for example in the case of objects relating to news applications, where currency is always checked to assure integrity of the information.

[0823] The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects. For example, objects that are designated as ultrastable in a storage control parameter in the header of the object are never version checked unless a special version control object sent to the RS as part of logon indicates that all such objects must be version checked. Object storage facility 439 marks all object entries with such a stability

category in all directories indicating that they must be version checked the next time they are requested.

Neither the object verification discussed in [0821-0822] (in which as objects are requested from object storage facility 439 the latest version is provided to guarantee currency of information to the user) nor frequency with which the currency of objects is checked, as disclosed in [0823], suggests either the claimed feature of: “determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information” or the examiner’s characterization of that feature: “wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]).”

Filepp’s object storage facility 439 assures currency by requesting version verification from network 10 for those objects which are available locally and by requesting objects that are not locally available from delivery system 20 where currency is maintained. However, these teachings have no relevance to the claimed feature of claim 1. Rather, version verification as taught by Filepp teaches away from the claimed feature of claim 1, because in Filepp each time an object is requested, verification of the version is requested, whereas claim 1 is directed to proactively determining if a stored answer in the cache is stale . . . and sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale. Filepp does not teach this feature of proactively determining.

Filepp at [0823] also discusses that: “The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects.” However, this teaching also is not relevant to the claimed feature, since the objects are updated based on their designation, e.g., ultrastable objects are “never version checked unless a special version control object sent to the RS as part of logon indicates that all such objects must be version checked.”; or “Object storage facility 439 marks all object entries with such a stability category in all directories indicating that they must be version checked the next time they are requested.”

According, any combination of the cache management algorithm taught by Filepp, or the cache management algorithm the examiner says was taught by Filepp, with Mehovic’s teachings,

still fails to provide the features of claim 1 or even the examiner's mischaracterization of the features of claim 1.

In the examiner's Response to Arguments the examiner argues that: "Applicant ... does not explain what the criterion is and how they are different." Appellant responds that criteria are found in Appellant's specification (See for example page 16). However, the examiner has not furnished any prior art that would require Appellant to limit the claims to any particular set of criteria.

Accordingly, claim 1 is neither described nor suggested by Mehovic as modified by Filepp.

Claims 2, 20, 30 and 31

For the purpose of this appeal only claims 2, 20, 30 and 31 stand or fall together. Claim 2 is representative of this group of claims.

Claim 2 further limits claim 1 and calls for ... monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information. The examiner contends that:

As per claim 2, Mehovic and Filepp teach the method of claim 1 as discussed above. Filepp also teaches: "monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information" at pages 50-51, [0821]-[0827].

Appellant contends that no combination of Mehovic with Filepp suggests this feature of claim 2. Appellant contends that Filepp does not suggest the claimed feature whether in paragraphs 821-827 or elsewhere. Claim 2 requires monitoring availability queries made to the cache by a travel planning system in order to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information. Filepp does not teach any aspect of the travel planning features of this claim or the aspect of monitoring queries made by another system to the cache in order to forecast which data in the cache to check for possible updating. Filepp teaches to version test cacheable objects and, if the object is not present, to fetch the object. No aspect of Filepp, however, teaches to monitor queries made to

the cache and to determine demand for that information from what is being requested for the purpose of determining if the stored answer is stale.

In rejection of claim 1, the examiner contends that:

... By factoring the frequency of updating of the objects in order to determine whether cached ' objects are current, Mehovic's system would detect the flights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.

The examiner reasons that one can detect and update flight data in the system disclosed by Mehovic. This is incorrect. Recall that Mehovic is directed to a system to migrate PNR's. PNR's are reservation records, not the raw flight and fare data that are searched and combined to provide travel solutions and booking of tickets that result in the formation of PNR's. Moreover, there is absolutely no teaching in Mehovic or Filepp that would suggest monitoring of queries made to the cache, or of monitoring of queries made to the cache to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

Claims 3 and 21

For the purposes of this appeal only, claims 3 and 21 may be treated as standing or falling together. Claim 3 is representative of these claims.

Claim 3 recites that determining if the stored answer is stale includes scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key ..., submitting a query to the availability source and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

The examiner contends that:

As per claim 3, Mehovic and Filepp teach the method of claim 1 as discussed above. Mehovic also teaches: "scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key on the list in the order given, submitting a query to the availability source; and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache." at Col. 6 line 40 to Col. 7 line 15.

Claim 3 is allowable over the combination of references since no combination of these references suggests the recited scheduling. The examiner relies on Mehovic to teach this feature, and specifically uses Mehovic's teaching of the PNR (Passenger Name Record). A PNR is a structure used in the airline industry to track a specific reservation and ticket brought by a customer. No aspect of the PNR is used as or suggests a scheduling mechanism that updates or adds, entries in the cache. Moreover, no aspect of the PNR is used in submitting a query to the availability source.

Claims 5, 7-11, 23-26

For the purposes of this appeal only, claims 5, 7-11, 23-26 may be treated as standing or falling together. Claim 5 is representative of these claims.

Claim 5 is directed to an availability system used for a travel planning system. The availability system includes a cache including a plurality of entries of availability information of seats for a mode of transportation and a cache manager. The cache manager manages a quality level of entry information in the cache by proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale.

Appellant notes that the examiner has not sought to reject this claim under 35 U.S.C. 112, second paragraph, as being indefinite because it recites high quality levels, nor has the examiner explicitly ignored limitations in these claims. Rather the examiner bases rejection of these claims solely on the examiner's interpretation of the prior art.

Mehovic taken together with Filepp fails to disclose all of the features of claim 5. No combination of Mehovic with Filepp suggests an availability system use for a travel planning system. The base reference Mehovic does not specifically teach the travel planning system portion of the CRS. That is, the base reference instead focuses discussion on the reservation

portion of a CRS. Moreover, the base reference does not even address any aspect of seat availability or the problems with using seat availability information by travel planning systems.

The examiner uses the same basis as in claim 1 to reject this claim, namely, ... that "Mehovic substantially teaches the claimed invention", but that Mehovic uses "a different cache management algorithm." and Filepp teaches "an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823])."

As was argued in claim 1, Mehovic never described that the CRS included a revenue management system, or the like, and never described migrating of seat availability information. Appellant notes that it is not logical to assume that Mehovic does migrate seat availability information, since Mehovic is directed to a fundamentally different problem than that of Appellant. Mehovic teaches "to automate the migration of data structures from an airline TPF based CRS processing environment and, in particular, the American Airlines' SABRE TPF based CRS environment to a relational database management system (RDBMS) for transparent retrieval and use by the end user."

Appellant contends that the features the examiner relies on, namely a cache including entries that correspond to seat availability information, are not taught by Mehovic. Rather, Appellant contends that the examiner improperly relies on an inherency argument and that a cache including entries that correspond to seat availability information" is not inherent² in Mehovic. Accordingly there is no basis upon which to infer that Mehovic migrates seat availability data.

Notwithstanding the lack of motivation to combine, neither the examiner's motivation nor the proposed combination is directed to the claimed features, as discussed for claim 1. Claim 5 also recites that: "... a cache manager that manages a quality level of entry information ... by proactively populating the cache to maintain a high quality level of entries of seat availability information ... , with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information. The

² *In re Sporman*, 363 F.2d 444, 150 U.S.P.Q. 449 (C.C.P.A. 1965). (discussed above)

cache manager also “sends an availability query to a source of seat availability information ... based on determining that the seat availability information in the cache was stale”

The examiner characterizes Appellant’s cache update mechanism as “proactively update the cache based on frequency of access to the cache as claimed.” This is incorrect. Rather, the cache is updated based on “evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information.” Thus, as those needs change, for whatever reason, the cache is proactively updated with availability data deemed necessary for the travel planning system.

Nevertheless, Filepp does not teach the characterization of the cache update mechanism that the examiner relies on, as discussed above regarding Filepp’s disclosure in paragraphs [0821]-[0823] of version testing. Rather, Appellant’s cache manager determines whether an entry is stale by determining what the needs are of the travel planning system, the system that is the consumer of the data in the cache. Thus, unlike Filepp where the object storage facility 439 can assure currency by requesting version verification from network 10, in claim 5 the cache manager determines what the needs of the consuming system, e.g., travel planning system are and based on those needs proactively updates entries in the cache. Therefore, no combination of Filepp and Mehovic suggests the features of claim 5.

Claim 6

Claim 6 limits the availability system of claim 5 and recites that the cache manager determines when an entry should be added to the cache. According to the examiner Mehovic teaches:

As per claim 6, Mehovic and Filepp teach the system of claim 5 as discussed above. Filepp also teaches the cache manager determines when an entry should be added to the cache at [0826].

Paragraph [0826] of Filepp discloses so called “Cacheable objects.” According to Filepp, a cacheable object can be retained during a current user session, but cannot be retained between sessions. According to Filepp, the object storage facility 439 retains objects in the cache according to the LRU storage retention algorithm. Accordingly to Filepp, the “Object storage facility 439 uses the LRU algorithm to ensure that objects that are least frequently used forfeit

their storage to objects that are more frequently used.” Teaching of a LRU algorithm only governs whether or not the object will be retained in the cache and not whether an entry should be added to the cache.

Claims 12 and 27

For the purposes of this appeal only, claims 12 and 27 may be treated as standing or falling together. Claim 12 is representative of these claims.

Claim 12 further limits claim 10 and recites that entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.

The examiner contends that: “As per claim 12, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or delete are determined from a distribution or nature of availability queries poses to the cache at [0826]-[0827].”

Claim 12 is distinct over the combination of Mehovic and Filepp. Filepp teaches at [0826] a session basis for retention of cacheable objects, namely that cacheable objects are retained during a current user session but cannot be retained between sessions. Moreover, at [0827] Filepp teaches “Trashable objects” that are retained in on a context basis of a partitioned application in which the object was requested. According to Filepp “Trashable objects” usually have a very high update frequency and must not be retained to ensure that the user has access to the most current data.

Claim 12 requires that: “entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.” Filepp fails to teach any mechanism by which the distribution or nature of availability queries posed to the cache determines entries to be added, modified, or deleted. Rather, Filepp teaches that cacheable objects can be retained during the current user session, but cannot be retained between sessions and are retained according to the least recently used retention algorithm (LRU) and trashable objects, those that are updated at a very high frequency must not be retained. None of these teachings, however, suggest the claimed feature.

An example can be used to show how these teachings of Mehovic and Filepp have no relevance to the claims. At page 19, lines 1-9 Appellant describes:

The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information. If a flight is determined to have a higher than average or higher than expected demand, then it might be added to the cache earlier than it would have been otherwise, or it might be updated more often to make sure the information is fresh.

Thus, whereas, Appellant's system would tend to update these entries more frequently, Filepp would teach to avoid storing them in the cache in the first instance, viewing them as a "trashable object," as the examiner seems to imply. Of course, were such a cache management scheme actually employed in Appellant's invention, such a scheme would work against the very point of the invention to keep the entries fresh and to keep in the cache those entries that are most likely needed by the travel planning system.

Claims 13-16 and 28-29

With respect to claims 13-16 and 28-29, which deal with aspects of prediction and modeling, the examiner fails to show what purpose would be served by adding a predictor (as allegedly taught by Filepp) to the system taught by Mehovic. Mehovic is directed to a migration tool that migrates PNR's and other transaction records to a RDBMS system. Recall that the PNR's are structures used to store reservation information. The examiner has failed to show any purpose that would be served by modifying Mehovic to include a predictor. Indeed, Appellant contends that no purpose would be served by the purported combination. Therefore, because the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, *supra*. Here the examiner has failed to show any basis for the purported combination and clearly the purported combination would indeed change the principal of operation of the prior art invention and therefore is, *per se*, not suggested.

Claims 13 and 28

For the purposes of this appeal only, claims 13 and 28 may be treated as standing or falling together. Claim 13 is representative of these claims.

Claim 13 recites that entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future. The examiner contends that:

As per claim 13, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future at [0826]-[0830].

The examiner fails to show where Filepp teaches at [0826]-[0830] or elsewhere to use a predictor to model which availability queries are likely to be posed, in order to determine which entries to add, update or delete. Rather, Filepp merely teaches “Cacheable objects” [0826], “Trashable objects,” [0827] and in [0828]-[0830] locating as many information and transactional support objects which the user is likely to request, as close to the user as possible. However, none of these teachings suggest the claim feature, because none of the teachings involve any aspect of modeling or prediction or use of a predictor. Rather, Filepp clearly describes that these located transactional objects are “objects required to support a desired application” Even at [0830] where Filepp teaches “to optimize the effectiveness of the limited storage space at RS 400, the collection of objects is restricted to those likely to be requested by the user; i.e., tailored to the user's tastes--and to those least likely to be time sensitive; i.e., objects which are stable.” does not involve any aspect of prediction, since that is already determined based on the desired application and, in any event, does not teach “by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future.”

Claims 14 and 29

For the purposes of this appeal only, claims 14 and 29 may be treated as standing or falling together. Claim 14 is representative of these claims.

Claim 14 limits claim 13 and recites that the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical

data or previously predicted information, simulations of various availability systems and actual availability data sources.

The examiner contends that: "As per claim 14, Mehovic and Filepp teach the system of claim 13 as discussed above. Filepp also teaches the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actually availability data sources" at [0826]-[0830]."

Filepp does not teach any predictor, much less a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actual availability data sources as the basis for the predictor or the model.

Claim 15

Claim 15 recites that entries to be added, modified, or deleted are determined by comparing actual answers or cached answers to predictions made by a predictor or model of the availability information. As with claims 13 and 14, the combination of Mehovic with Filepp fails to teach this feature at [0826]-[0830] of Filepp or elsewhere. To what purpose would the modified transaction system of Mehovic put a predictor to?

Claim 16

Claim 16 recites that the predictor used to guide the cache manager operation predicts the rate of change or time of change of the seat availability. Neither Mehovic nor Filepp teach seat availability information, nor does Filepp teach a predictor. Therefore Filepp cannot teach to use a predictor to guide the cache manager operation by predicting the rate of change or time of change seat availability information whether at [0826]-[0830] or elsewhere.

Claim 17

Claim 17 recites that entries to be added, modified, or deleted are determined by prior knowledge, such as busy travel days, important or busy markets, or busy travel times. The examiner contends that: "As per claim 17, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by

prior knowledge at [0826]-[0830].” The examiner fails to show where Filepp teaches at [0826]-[0830] or elsewhere to add, update or delete based on prior knowledge of busy travel days, important or busy markets, or busy travel times. Rather, Filepp merely teaches “Cacheable objects” [0826], “Trashable objects,” [0827] and in [0828]- [0830] information and transactional support objects. As disclosed by Filepp, none of these teachings involve any aspect of modeling or prediction or use of a predictor, but rather are “objects required to support a desired application” Even at [0830] where Filepp teaches the collection of objects is restricted to those likely to be requested by the user; i.e., tailored to the user's tastes--and to those least likely to be time sensitive; i.e., objects which are stable, they are still the objects required by the application not based on any prior knowledge, such as busy travel days, important or busy markets, or busy travel times.

Claim 18

Claim 18 recites that entries to be modified or deleted are determined by the date of travel for the seat in comparison to the current date. The examiner also uses the same argument for rejection of this claim as was used in claim 17. Again, Mehovic taken with Filepp fails to teach to update entries based on a date of travel for a seat in comparison to the current date.

Claim 32

Claim 32 limits claim 30 and includes observing and parsing queries made to the cache by a travel planning system; and updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed; and based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often.

The combination of Mehovic with Filepp does not suggest any aspect of observing and parsing queries made to the cache . . . and updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed; and based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the

availability source more or less often. This claim is probably closest to the examiner's characterization of the Appellant's cache update mechanism. However, as discussed above, the combination of Mehovic and Filepp fails to suggest the cache mechanism, as characterized by the examiner.

**(2) Claims 4 and 22 are patentable over
Mehovic, Filepp, and Khosravi-Sichani.**

Claims 4 and 22

For the purposes of this appeal only, claims 4 and 22 stand or fall together. Claim 4 is representative of this group of claims.

Claim 4 further limits claim 1 and recites wherein determining if the stored answer is stale includes scheduling multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list, returning to the first list to process the next entry, generating an entry for each entry on the list in the order given, by submitting a query to the availability source and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

Appellant contends that the main references Mehovic and Filepp fail to suggest the basic features of claim 4, and that inclusion of Khosravi fails to cure that deficiency.

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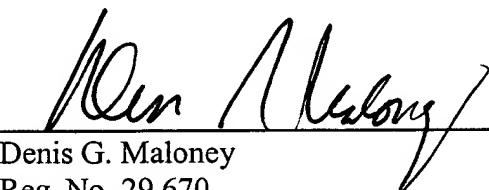
Attorney's Docket No.: 09765-018001

Conclusion

Appellant submits, therefore, that Claims 1-32 are allowable over the cited art.
Therefore, the Examiner erred in rejecting Appellant's claims and should be reversed.

Respectfully submitted,

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Appendix of Claims

1. A method executed on a computer system for managing a cache including entries that correspond to seat availability information, the method comprises:

proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information; and if the stored answer pertaining to seat availability information is stale,

sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale.

2. The method of claim 1 wherein the mode of transportation is air and determining if the stored answer is stale further comprises:

monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

3. The method of claim 1 wherein determining if the stored answer is stale comprises:

scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key on the list in the order given,

submitting a query to the availability source; and

storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

4. The method of claim 1 wherein determining if the stored answer is stale comprises:

scheduling multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list;

returning to the first list to process the next entry;
generating an entry for each entry on the list in the order given, by
submitting a query to the availability source; and
storing the result in the cache, by updating an entry if present and adding an entry if not
present in the cache.

5. An availability system used for a travel planning system comprises:
a cache including a plurality of entries of availability information of seats for a mode of
transportation; and

a cache manager that manages a quality level of entry information in the cache by
proactively populating the cache to maintain a high quality level of entries of seat availability
information in the cache, with the quality level of the seat availability information in the cache
determined by evaluating entries in the cache according to a criterion related to needs of a travel
planning system that makes queries to the cache for obtaining seat availability information, and
that sends an availability query to a source of seat availability information for the mode of
transportation based on determining that the seat availability information in the cache was stale.

6. The availability system of claim 5 wherein the cache manager determines when
an entry should be added to the cache.

7. The availability system of claim 5 wherein the cache manager determines when
an entry should be deleted from the cache.

8. The availability system of claim 5 wherein the cache manager determines when
an entry already in the cache should be modified.

9. The availability system of claim 5 wherein entries to be added, modified, or
deleted are obtained by asynchronous notification from external systems.

10. The availability system of claim 9 wherein entries to be added, modified, or deleted are taken from a list or multiple lists of predetermined entries.

11. The availability system of claim 10 wherein the entries in the list include predetermined orderings or priorities.

12. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.

13. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future.

14. The availability system of claim 13 wherein the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actual availability data sources.

15. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by comparing actual answers or cached answers to predictions made by a predictor or model of the availability information.

16. The availability system of claim 13 wherein the predictor used to guide the cache manager operation predicts the rate of change or time of change of the seat availability.

17. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by prior knowledge, such as busy travel days, important or busy markets, or busy travel times.

18. The availability system of claim 10 wherein entries to be modified or deleted are determined by the date of travel for the seat in comparison to the current date.

19. A computer program product residing on a computer readable medium for managing a cache for predicting availability information for a mode of transportation, comprises instructions to cause a computer to:

proactively determine whether a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on the mode of transportation, with instructions to determine being based on a determined criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information; and,

update the stored answer in the cache when the stored answer is stale by sending an availability query to a source of availability information for the mode of transportation.

20. The computer program product of claim 19, wherein the mode of transportation is air and the product further comprising instructions to:

monitor availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

21. The computer program product of claim 19 further comprising instructions to:

- schedule a list of keys where the keys are identifiers of specific instances to update or add and for each entry on the list in the order given,
- submit a query to the availability source; and
- store the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

22. The computer program product of claim 19 further comprising instructions to:

- schedule multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list,

return to the first list to process the next entry;
generate an entry for each entry on the list in the order given;
submit a query to the availability source; and
store the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

23. A computer program product for determining seat availability in a travel planning system comprises instructions to cause a computer to:

cache entries of seat availability information for a mode of transportation; and
manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified;

delete or modify the entry based on determining that the entry should be deleted or modified; and

proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified.

24. The computer program product of claim 23 wherein entries to be added, modified, or deleted are obtained by asynchronous notification from external systems.

25. The computer program product of claim 24 wherein entries to be added, modified, or deleted are taken from a list or multiple lists of predetermined entries.

26. The computer program product of claim 25 wherein the entries in the list include predetermined orderings or priorities.

27. The computer program product of claim 24 wherein entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.

28. The computer program product of claim 24 wherein entries to be added, modified, or deleted are determined by using a predictor or model of availability queries which are likely to be posed or are likely to be useful in the future.

29. The computer program product of claim 28 wherein the predictor or model of availability queries likely to be posed is based on at least one of deterministic, probabilistic, statistical classifier or predictor, databases, cache of historical data or previously predicted simulations of availability systems and actual availability data sources.

30. A method for managing availability information for a seat on a mode of transportation, comprises:

determining which entries to add, delete, or update in the cache by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information;

proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand.

31. The method of claim 30 wherein the mode of transportation is air and the instances of transportation are flights, which include flights, a certain day, date, or market, which are added to the cache earlier or refreshed more often than the flights would otherwise have been added or refreshed, to make sure the information is fresh.

32. The method of claim 30 further comprising:
observing and parsing queries made to the cache by a travel planning system; and
updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed; and

based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often.

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Evidence Appendix

None

Related Proceedings Appendix

None